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TREE WIRE



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TREE WIRE



The Okonite Company

FOUNDED 1878

The Okonite-Callender Cable Company, Inc.

Factories: PASSAIC, N. J.

PATERSON, N. J.

Sales Offices:

New York • Chicago • Pittsburgh • St. Louis

Atlanta • Birmingham • San Francisco

Los Angeles • Seattle



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The Okonite Company
The Okonite-Callender Cable Company, Inc.

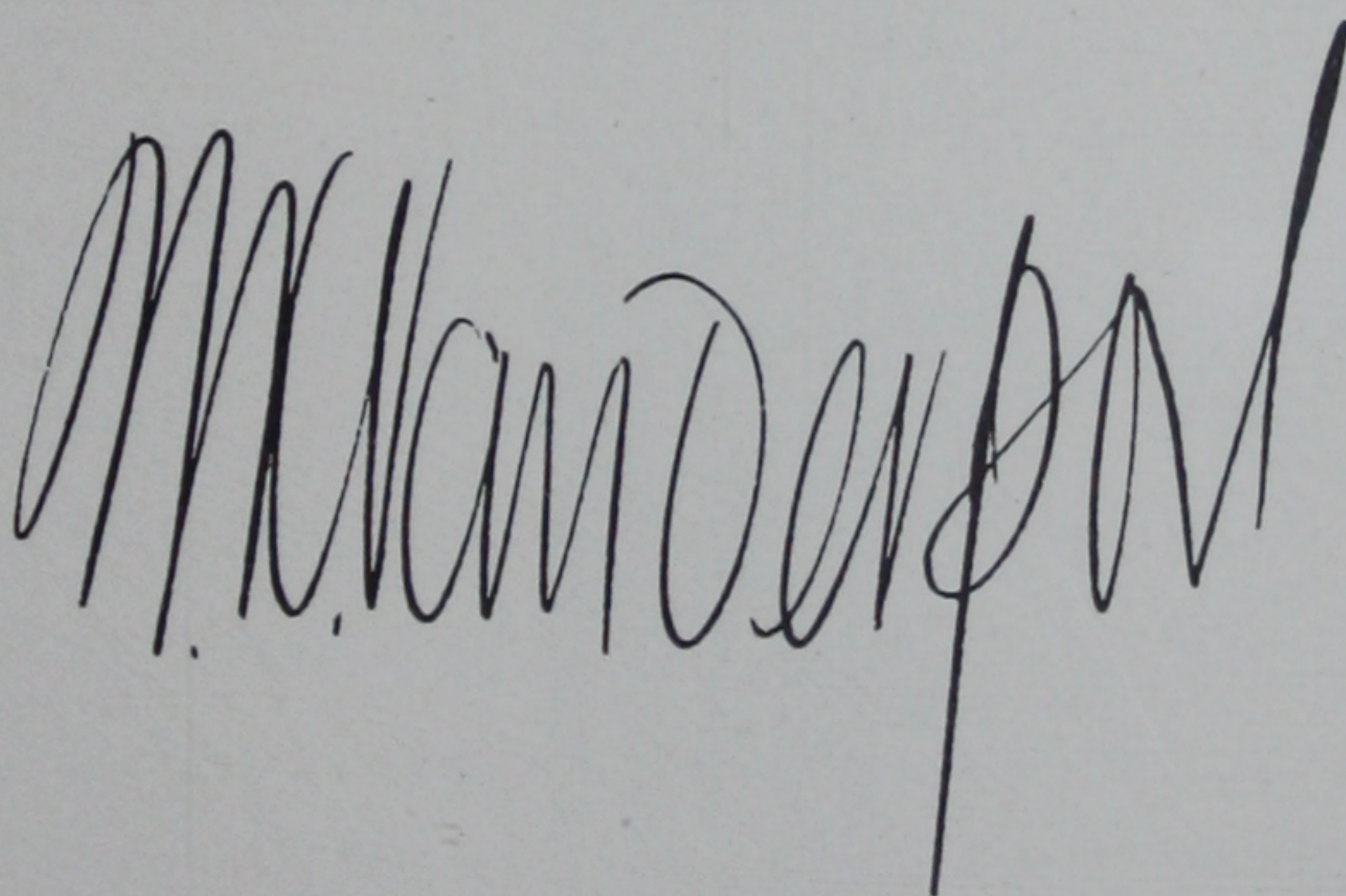
To Operating Executives:

This little book is issued to the electric light and power industry in view of the growing demand for a highly reliable tree wire and for more explicit information as to its use and proper installation.

I feel particularly interested in this matter because of an experience of some twenty years in practical plant operation and a country-wide study of line construction problems. During that period thousands of installations of tree wire were made on properties under my supervision.

In reviewing the results of various operating practices I recall nothing more outstanding than the advantages afforded by the discriminate use of tree wire. Under certain conditions it is indispensable; providing, as it does, a real insurance to service and effecting large savings in maintenance and other costs.

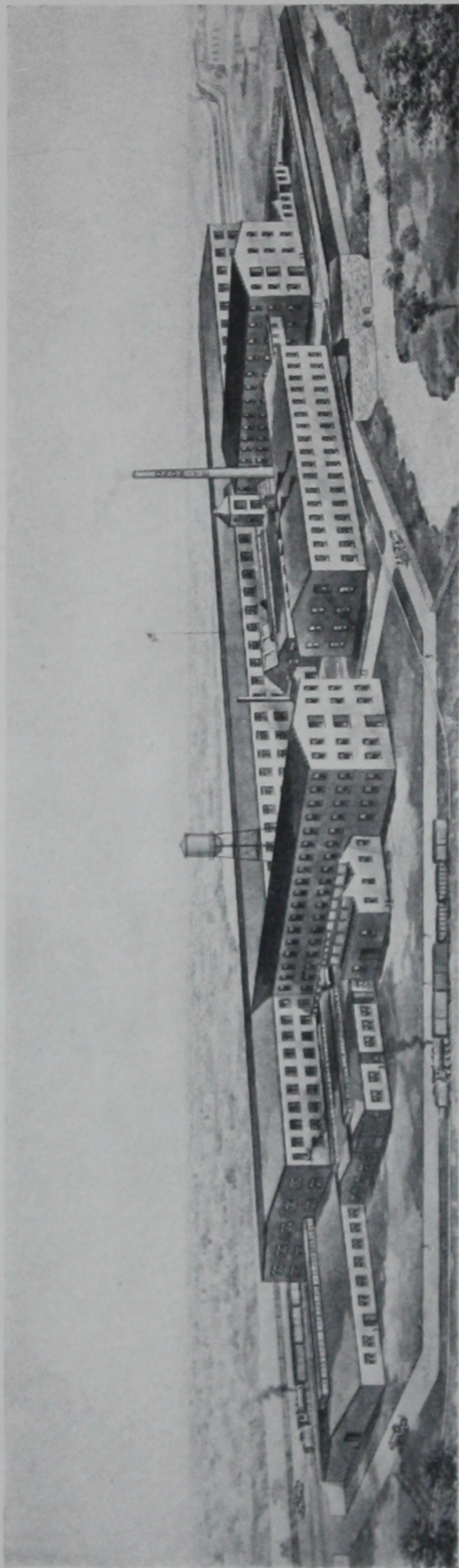
I believe it very much worthwhile to have every outside plant thoroughly gone over to find any "bad spots" requiring this protection.

A large, stylized handwritten signature in dark ink, appearing to read 'W. K. Vanderpoel'.

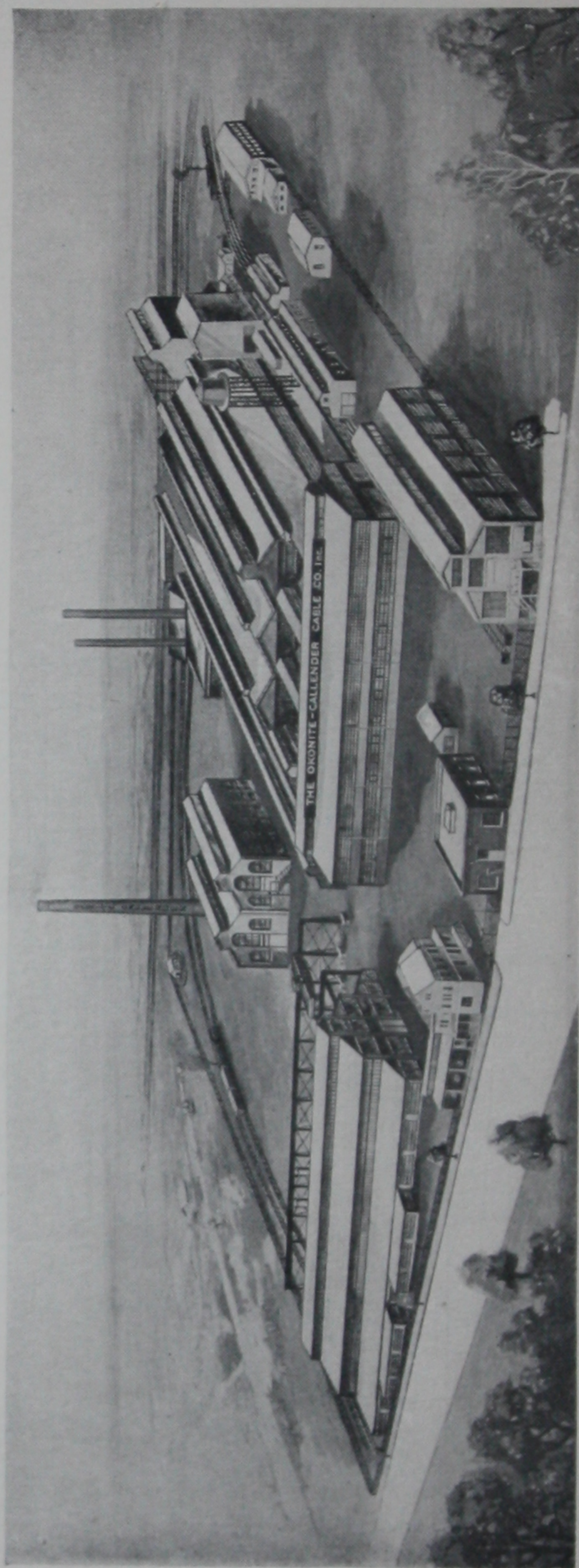
(W. K. VANDERPOEL)
Vice President and Executive Engineer

Before becoming associated with the Okonite organization, Mr. Vanderpoel was General Superintendent of Distribution with the Public Service Electric & Gas Company (New Jersey). He has always been actively identified with important national technical committees and is a recognized authority on outside plant construction.

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Factory: The Okonite Company, Passaic, N. J.



Factory: The Okonite-Callender Cable Co., Inc., Paterson, N. J.



Okonite Tree Wire

Why Needed

Okonite Tree Wire has been used for many years to overcome the annoying and very often serious troubles experienced with ordinary weatherproof wire when electric light and power lines must be placed through trees.

Unless a wire having the best of rubber insulation and a very durable protective covering is employed where trees are dense, the continued abrasion due to swaying of the limbs will damage the insulation, thus causing current leakage which will gradually kill the trees, and may result in ultimately burning down the wire. This is particularly liable to happen in the Spring of the year with the trees full of sap and in times of heavy storms when the wind causes violent whipping of the branches and the weatherproof insulation becomes rain soaked.

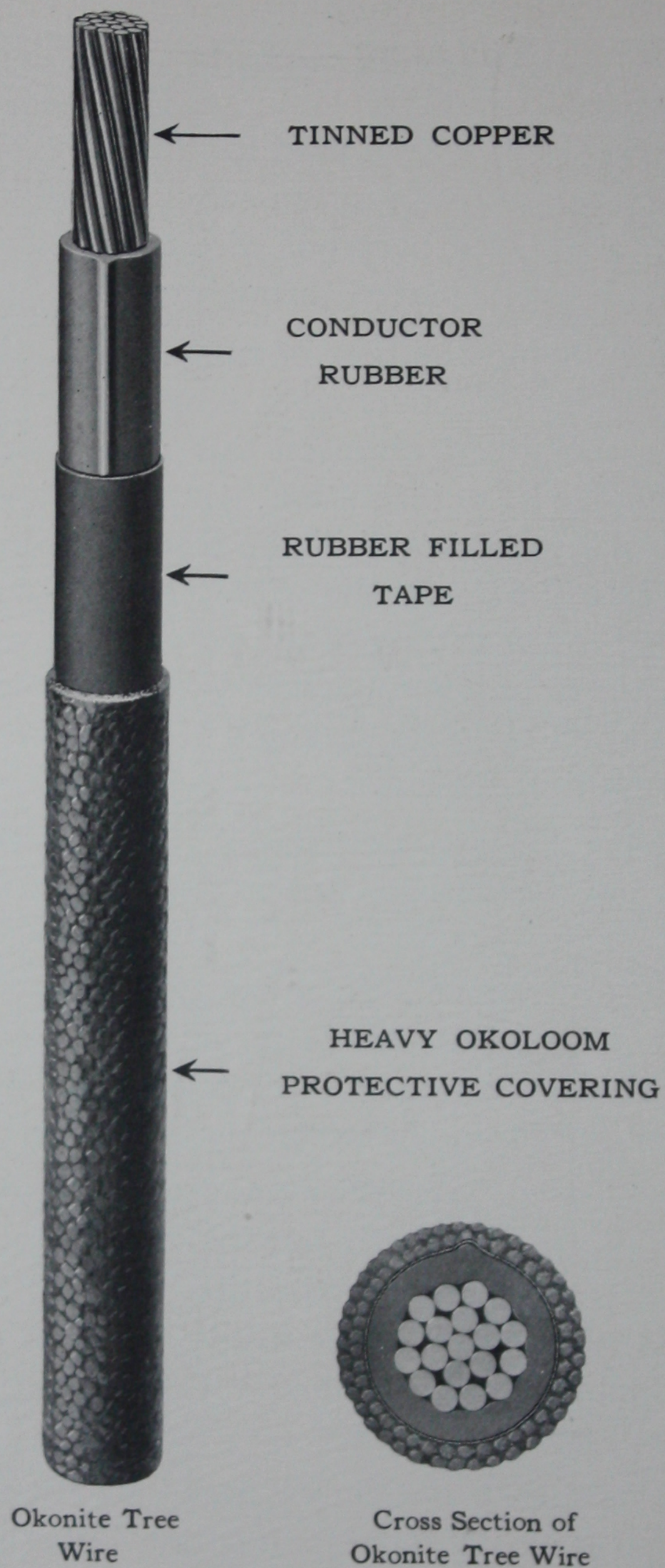
Electric light and power companies have found that many cases of radio interference are due to the arcing of wires in trees.

Trimming the trees will do away with some of these troubles temporarily, but this is an added expense which must be incurred at frequent intervals, and it is often a difficult matter to obtain the necessary trimming permits.

The use of Okonite Tree Wire assures safe and uninterrupted operation of lines with freedom from grounding in trees; it also means effective protection to radio reception. Properly installed, it can be depended upon to effect an enormous reduction in outside plant troubles with a corresponding improvement in service.

Better service means not only fewer long interruptions, but the removal as well of those momentary but none the less annoying disturbances caused by intermittent contacts of







exposed conductors with trees. By exposed conductors is meant those from which the ordinary weather proof insulation has been worn off. The number of hazardous and difficult emergency line repair jobs will be largely reduced.

Avoidance of the expense of frequent line repairs, injuries to trees, and accident damages will, in even a short time, more than justify the first cost of tree wire. Loss of revenue from interrupted service must also be considered.

Where there is constant and excessive damage to trees the resultant aggravation to property-owners may cause serious agitation to have the lines re-routed or possibly placed underground. From this standpoint, alone, the investment in tree wire is unquestionably warranted.

How Used

The Okonite Company has, for years, studied the practical plant conditions requiring the use of tree wire, and offers the result of its field observations to companies confronted with changes of system voltages or having tree conditions calling for effective correction. Tree wire has been found to be a special necessity in plants changing their distribution voltages from 2400 to 4000 volts.

The means sometimes employed to overcome grounding troubles where conditions are bad is to over-build the trees by using very tall poles. This is frequently only a temporary measure of relief as it does not prevent the trees from eventually growing into the wires.

The correct practice today is to install shorter poles so that the wires will be *between the larger limbs lower down in the trees*. Here the motion of the heavier limbs is much less than the lighter limbs higher up and chafing of the wires is consequently minimized.

Short poles are moreover much cheaper, easier to install





Tree Wire and Moulding Installed Through Lower Branches

and maintain and they present a far better appearance than tall poles. In some cases, as in line reinforcement work, the short construction can be obtained by cutting off the tops of the tall poles after the old weatherproof wires have been replaced with tree wire at the lower level.

The Okonite Company has found through its investigations that some companies are not yet using tree wire and that others are in doubt regarding the correct method of using it. For this reason, the following information has been compiled. The instructions given may seem to be of an elementary character, but in view of the general lack of information and the importance of doing all of the installation work correctly, the details are herewith presented.



Tree Wire Is Easy To Install Even Under the Worst Tree Conditions

Where wires are to be strung in a stretch with continuously bad tree conditions, tree wire should be used throughout. If, however, the bad spots are scattered, then weatherproof wire can be safely used to fill in the clear spaces. Should the intervening gaps be short, it can easily be determined whether the cost of splicing the weatherproof wire in them would be greater than that of using tree wire all the way through. As a general rule, it is usually economical to insert the weatherproof wire in open spaces of a span or more in length.

When installing a stretch of line where both tree and weatherproof wire are to be used, the latter should first be run in the entire length and pulled taut. To prevent waste the weatherproof wire should not be cut from the last reels but at the first place where tree wire is needed. The tree wire



A "Close-up" of Tree Wire with Moulding





Typical Tree Wire Installation. Such Construction Means No Line Trouble

is then spliced on and the weatherproof wire is reeled up until the tree wire has been pulled through the place to be protected. The tree wire is then cut and spliced on to the other end of the weatherproof wire and the line again pulled taut. If this method is repeated at each spot to be protected, the tree wire will be in the proper place when the line is finally pulled up and tied in.

To correctly locate the wire in the trees on this kind of a job, one lineman climbs the pole nearest to the first tree to be cleared; other men follow in the trees in succession from that pole. The lineman on the pole throws his hand line to the one in the first tree and by sighting through to the

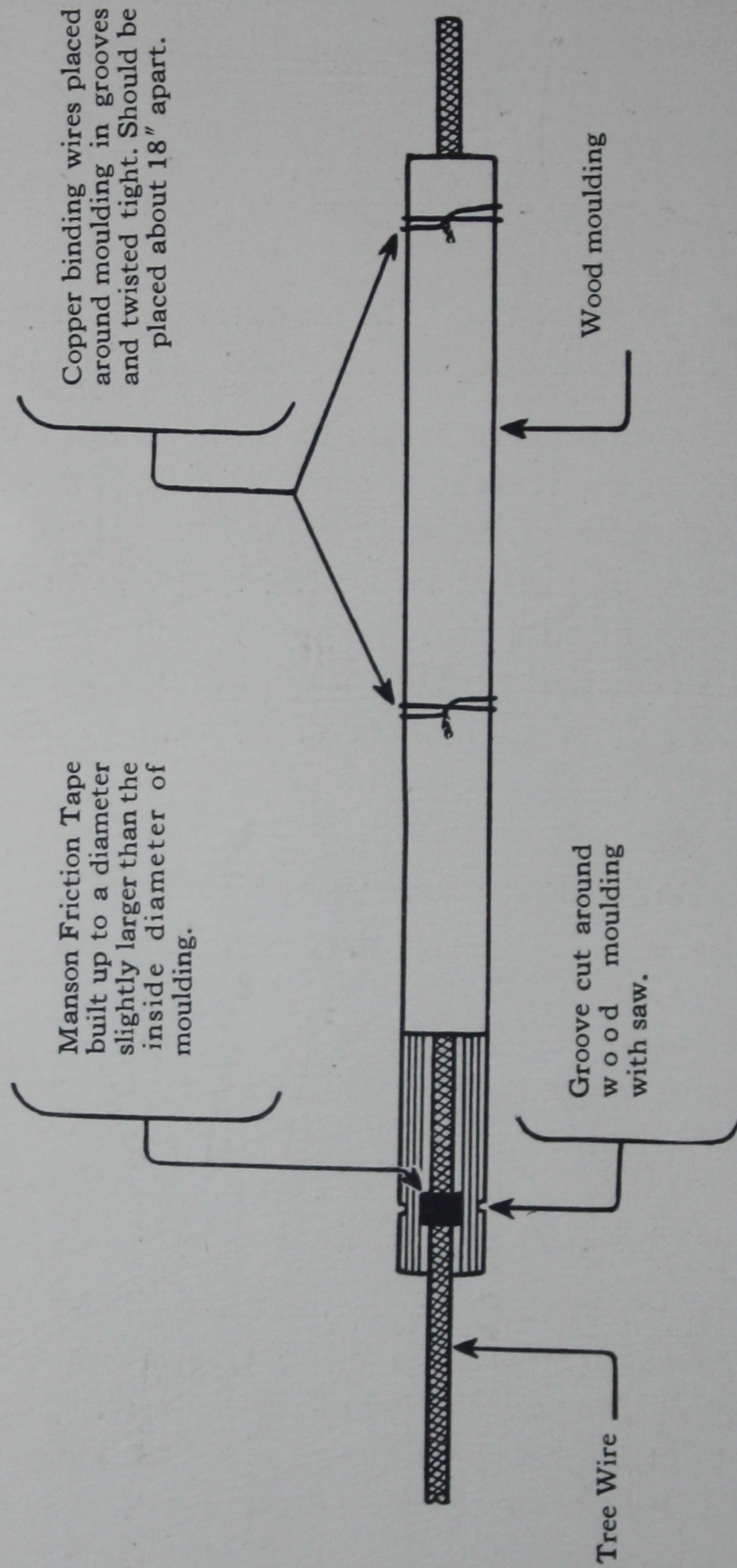
corresponding pin on the pole ahead, directs lineman number two where to put the line through. He then sights for the lineman in the next tree, and so on. The running line can be pulled through by the groundmen. These precautions in sighting for the running line are necessary if the tree wire is to lie properly through the branches when it is pulled up and tied in.

In places where there would be an *extraordinary* amount of chafing the tree wire should be protected with moulding.

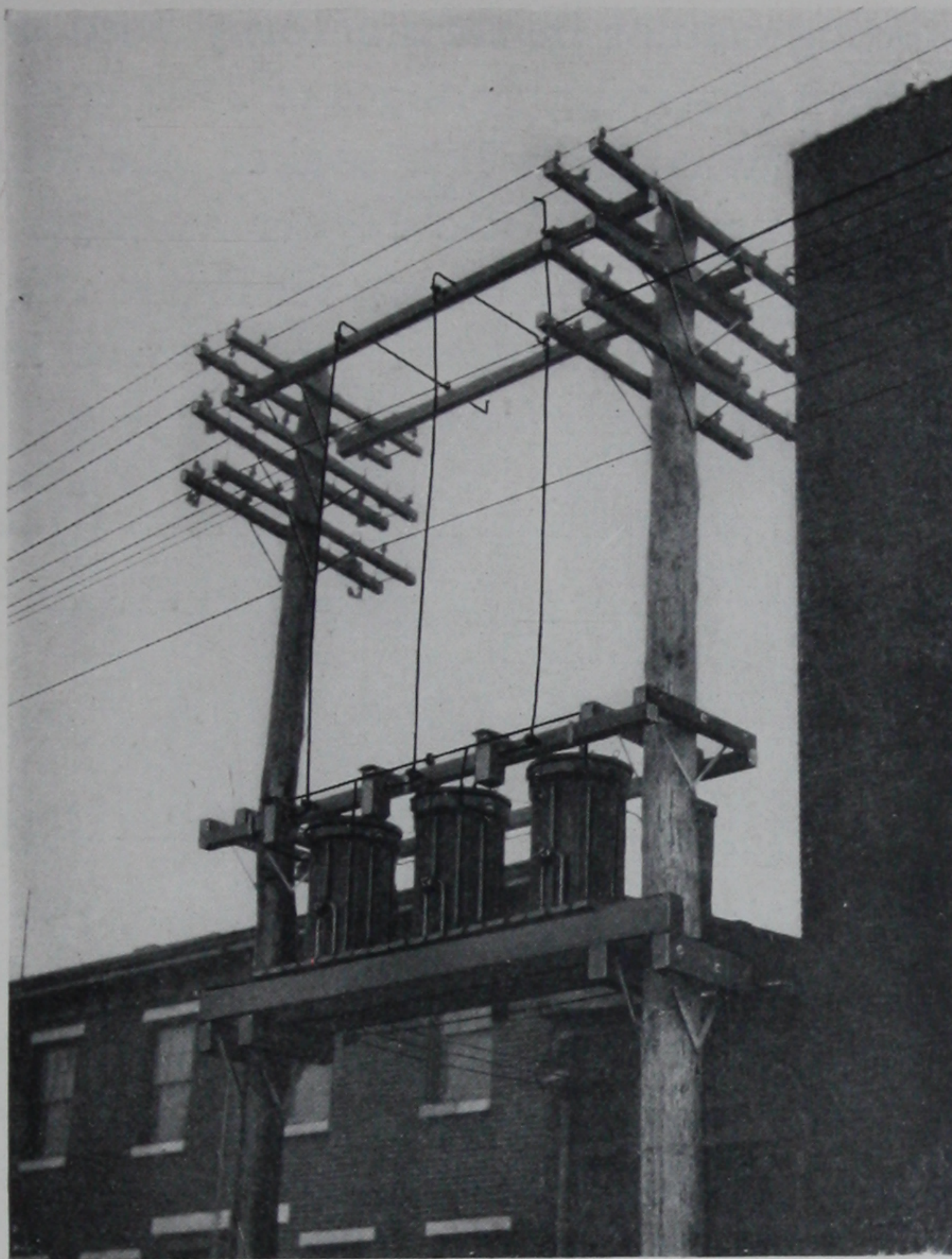
The moulding should be made of well-seasoned oak, ash, or other wood of equivalent characteristics; treated with a good grade of pole paint and stored under cover until thoroughly dry. It should be a little larger in inside diameter than the wire to be protected, so that it can be readily slipped over it. Small grooves for binding wire should be cut on the outside of each piece of moulding about a foot and a half apart.



Tree Wire Run Through Lower Limbs on
Short Poles



Showing Method of Installing Moulding on Tree Wire



Transformer Rack with Primary Wires Made Up of
Okonite Tree Wire

Tree moulding can, of course, be made in any size; but that with an inside diameter of $\frac{3}{4}$ " will be found suitable for tree wire up to No. 1, inclusive; and an inside diameter of $1\frac{1}{8}$ " for larger wires up to No. 4/0 inclusive.

The proper application of the moulding is an important part of tree wire installations. Manson friction tape should first be wrapped around the wire, about a foot and a half apart until it is slightly larger than the inside diameter of the moulding. The two halves of the moulding are now fitted over the wire, the soft copper binding wires being put on at the points where the grooves have been cut, and twisted tightly around the moulding.



Tree moulding cannot be satisfactorily used on ordinary weatherproof wire carrying voltages of 2400 volts and over. This is because when rain has soaked the weatherproof insulation, the current at the higher voltages will burn through it and the resultant arcing set fire to the moulding. Very destructive effects to trees have occurred in this way. The usual limit is 500 volts for such work.

It is undesirable to install pieces of moulding less than 30'' in length as the ends are very apt to be caught by the shorter limbs when they sway.

Making Joints and Repairing

In making a joint in Okonite Tree Wire, the conductor itself is spliced in the same manner as with weatherproof wire. After the splice is soldered, it is covered with Okonite rubber insulating tape to a thickness slightly greater than that of the original rubber insulation. Manson friction tape is then applied over the rubber tape to protect it and to gain the equivalent of the original protective covering.





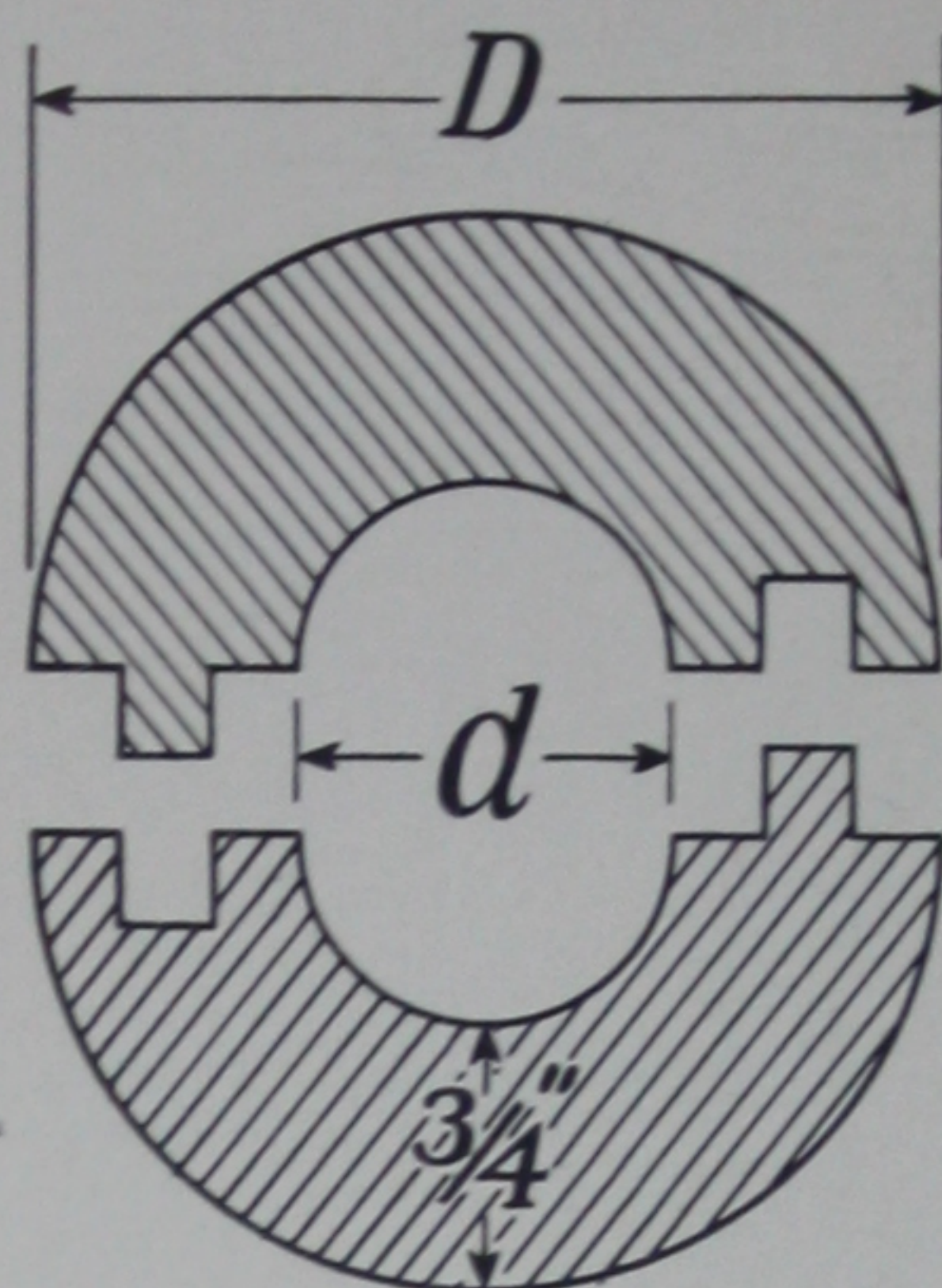
Should a failure occur in the tree wire due to improper placing of the moulding or to its slipping, the bad spot is easily repaired by cleaning off the burned insulation, applying Okonite rubber insulating tape and covering it with Manson friction tape. The moulding can then be replaced.

Other Uses of Okonite

Tree Wire

The use of Okonite Tree Wire affords most desirable and safe conditions for pole transformer installations, vertical runs and primary wiring on poles in general. For this purpose solid wire is particularly adaptable as it is stiff enough to "stay put" and readily lends itself to the neatest kind of workmanship.





Sectional View Tree Wire
Moulding

"D" and "d" Depend
Upon Size of Wire

Many electric light and power companies have discontinued the use of buck arms and install spreader brackets where there is only a limited number of primary and street circuits to be run from a pole. Busses made of Okonite Tree Wire on the brackets will eliminate trouble and assure safety to the line-men working on the poles.

There are many times when Okonite Tree Wire can be utilized in emergencies and in the course of the regular day's work. A reel of No. 6 or 4 is strongly recommended as standard stock on every line truck.

How Made

Okonite Tree Wire is made throughout in the most painstaking manner, and to meet the requirements of every day, every year use. Each step in its manufacture receives the same skilled and zealous supervision that characterizes the manufacture of all Okonite products.

The Conductor

Nothing but electrolytic copper is used for making the conductor and a careful check is kept on its conductivity and physical properties. All wire is drawn in our own plant under careful supervision and it is always smooth and true to gauge.





Illustrating Conditions Where Tree Wire
Should Be Used

Perfect tinning of the copper conductor for all rubber-covered wires is absolutely necessary to insure extreme durability. A coating of pure tin protects the copper from the action of the vulcanized rubber compound. The minutest flaw in this coating will allow a chemical action to begin and cause the conductor to be gradually eaten away. All Okonite wire is double-tinned, the second operation correcting any possible imperfections in the first.

The Insulation

The insulation is, of course, Okonite, which, for forty-four years has been known as "The Standard for Rubber In-





sulation." Okonite insulation never contains less than 30% by weight, over 60% by volume, of Up-River Fine Para Rubber. This rubber—the choicest that comes from the Amazon—is carefully washed of all impurities, and after being sheeted is hung in dark drying rooms for at least two months. This slow air drying process is more expensive than quick drying methods, but produces a tougher, denser, and more durable rubber.

After the rubber is thoroughly dried, it is ground and mixed with chemically pure mineral base fillers. After compounding it is allowed to season and is then rolled by means of callenders to the required thickness and backed with heavy sheet tin. The compound, with this tin backing, is now cut into strips and folded around the copper wire, (sheet tin on the outside) and rigidly held in this mold during vulcanization. This process produces a uniform, dense insulation in which the conductor is perfectly centered.



In Thousands of Places Like This Okonite Tree Wire Has Given
Reliable Service for Years





Pole Bracket Busses Wired with
Okonite Tree Wire

Protection

Over the insulation a heavy, lapped, rubber-filled cloth tape is applied and then a covering of Okoloom.

Okoloom, as its name indicates, is not an ordinary braid, but a heavy covering composed of specially twisted long fibered cotton threads, woven, (not braided) on the insulated wire and then saturated with a weatherproofing compound. The great durability of this outside covering in many years of severe service has been the chief means of establishing an absolutely unrivalled record for the serviceability of Okonite Tree Wire.





OKONITE TREE WIRE

OKONITE RUBBER INSULATION, HEAVY LAPPED TAPE AND OKOLOOM COVERING

Size A. W. G.	Number of Strands	5/64" Wall of Okonite		3/32" Wall of Okonite		4/32" Wall of Okonite		5/32" Wall of Okonite	
		Weight	Out- side Diam.	Weight	Out- side Diam.	Weight	Out- side Diam.	Weight	Out- side Diam.
6	Solid	204	.515	222	.540	267	.605	312	.665
4	"	270	.560	292	.585	338	.645	389	.710
2	"	363	.605	387	.640	436	.700	494	.765
1	"	426	.640	453	.670	505	.730	565	.795
1	7	452	.660	479	.710	532	.770	594	.835
0	7	520	.715	560	.750	616	.810	682	.875
00	7	635	.765	664	.795	724	.855	793	.920
000	19	775	.825	807	.855	871	.915	946	.980
0000	19	894	.875	946	.905	1015	.965	1094	1.030

Weight is given in pounds per 1000 ft.; dimensions in inches.
Weights and dimensions approximate.

Medium hard drawn or soft drawn copper wire will be furnished
as specified on order.

Unless otherwise specified medium hard drawn wire will be furnished.





Look for the SINGLE RIDGE



All OKONITE Insulated Wires carry our
Trade-Mark, A SINGLE RIDGE on the
insulation running parallel to the conductor.





Okonite Products

Okonite and Varnished Cambric Wires and Cables

*Any Size and Number of Conductors. Any Voltage.
Any Service. Braided, Lead Covered, Steel Braid,
Steel Taped, Steel Wire Armored*

Tree Wire . Okocord . Okoloom . Railway Signal Wire

Train Control Wire . Car Wire . Automobile Wire

Tree Wire . Locomotive Head Light Wire

Telephone and Telegraph Wires . Plough Leads

Pot Heads . Okonite Cement . Okonite Tape

Manson Tape . . Dundee "A" & "B" Tapes

Okonite-Callender Products

Impregnated Paper Cables . Super-tension Cables
Splicing Materials





The Okonite Company
The Okonite-Callender Cable Company, Inc.

Sales Offices

NEW YORK CITY	Bankers Trust Company Building, 501 Fifth Avenue
CHICAGO, ILL.	Straus Building, 310 South Michigan Boulevard
ATLANTA, GA.	Candler Building, 129 Peachtree Street
PITTSBURGH, PA.	First National Bank Building, 511 Wood Street
ST. LOUIS, MO.	Frisco Building, Ninth and Olive Streets
BIRMINGHAM, ALA.	Brown-Marx Building, First Avenue and 20th Street
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CINCINNATI, OHIO	The F. D. Lawrence Electric Company

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